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## PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

## Improvements in or relating to Gear-Wheels

We, ROBERT BOSCH GMBH. a German Company, of 4, Breitscheidstrasse, Stuttgart-W, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to toothed gear-wheels, and is applicable to toothed gear-wheels adapted for the drive mechanism of a windscreen wiper.

Known toothed gear-wheels often comprise a metallic disc securely attached to a shaft, preferably at one of its ends, and a rim of a resinous material adhered to the outer edge of the disc, the rim being produced by injection moulding and having a width which exceeds the thickness of the disc, and at least one of the faces of the disc is coated with a resinous material. With such gear-wheels it often happens that the coating of resinous material covering the face of the disc cracks in operation, due to the occurrence of contraction strain or to the differing thermal expansions of the disc and the resinous coating.

According to one aspect of the present invention, a toothed gear-wheel comprises a metallic disc securely attached to a shaft, a rim of a resinous material adherent to the outer edge of the disc, the rim being toothed and having a width which exceeds the thickness of the disc, and a resinous hub on at least one of the side faces of the disc said hub being connected to the rim through spoke-like ribs, these ribs and the hub and the rim having been produced simultaneously during a single injection moulding operation.

According to another aspect of the present invention, a method of manufacturing a toothed wheel comprises securely attaching a metallic disc onto a shaft, and forming on said disc by means of a single injection moulding operation a resinous toothed rim wider than the disc thickness, a resinous hub at one side of the disc, and a plurality of resinous

spoke-like ribs connecting the rim with the hub.

The invention will be further described by way of example with reference to the accompanying drawings in which:—

Fig. 1 is an end view of a toothed wheel according to a first embodiment of the invention;

Fig. 2 is a section taken on the line II—II of Fig. 1;

Fig. 3 is an end view of a toothed wheel according to a second embodiment of the invention; and

Fig. 4 is a section taken on the line IV—IV of Fig. 3;

In the two embodiments of Figs. 1 to 4 two metal discs 1 and 2 are pressed on to a milled section 3 of a shaft 4 and securely fixed to the shaft.

To produce the resinous coating the structural element comprising the shaft 4 and the metal discs 1 and 2 is inserted in a mould, whereupon the resinous material is injected into the mould. The mould is so formed that a resinous hub 5 covers the end of the shaft and a part of the disc 2, this hub being connected through spoke-like ribs 6 to an annular rim portion 7 which surrounds the outer edge of the discs 1 and 2 and has teeth 8 on its outer periphery. In operation, the hub 5 can give axial support to the shaft 4.

In the embodiment of Figs. 1 and 2 the ribs 6 are slightly curved and extend approximately in the radial direction, while the ribs 6' of Figs. 3 and 4 are tangential to the outer edge of the hub 5. In both cases the ribs 6, or 6', can readily counteract expansion differences simply by bending a little.

Certain features of the above described gear-wheels are contained in our prior patent specification No. 885,153 which claims a gear wheel, non-detachably mounted on a shaft, comprising at least two metal discs which are in direct contact with one another and rigidly fixed to said shaft, and a rim-forming com-

ponent is fitted about said metal discs and is formed from a synthetic plastic material and provided with gear teeth.

WHAT WE CLAIM IS:—

- 5 1. A toothed gear-wheel comprising a metallic disc securely attached to a shaft, a rim of a resinous material adherent to the outer edge of the disc, the rim being toothed and having a width which exceeds the thick-  
10 ness of the disc, and a resinous hub on at least one of the side faces of the disc said hub being connected to the rim through spoke-like ribs, these ribs and the hub and the rim having  
15 been produced simultaneously during a single injection moulding operation.
2. A toothed gear-wheel as claimed in claim 1, in which the ribs are inclined to the radial direction.
- 20 3. A toothed gear-wheel as claimed in claim 1 or 2 in which the ribs are curved.
4. A toothed gear-wheel as claimed in claim 1, 2 or 3, in which the disc is attached to one end of the shaft and said hub of resinous material overlies said shaft end.
- 25 5. A toothed gear-wheel in any of the preceding claims, in which a pair of discs in contiguous relation with one another are securely attached to the shaft.

6. A method of manufacturing a toothed gear-wheel comprising securely attaching a  
30 metallic disc onto a shaft, and forming on said disc by means of a single injection moulding operation, a resinous toothed rim wider than the disc thickness, a resinous hub at one side of the disc, and a plurality of  
35 resinous spoke-like ribs connecting the rim with the hub.

7. A toothed gear-wheel constructed substantially as hereinbefore described with reference to and as illustrated in Figs. 1 and 2 of  
40 the accompanying drawings.

8. A toothed gear-wheel constructed substantially as hereinbefore described with reference to and as illustrated in Figs. 3 and 4 of  
45 the accompanying drawings.

9. A method of manufacturing a toothed gear-wheel substantially as herein described with reference to Figs. 1 to 4 of the accompanying drawings.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of the Original on a reduced scale*

